ENHANCING AND ENABLING ADVANCED PROCESS CONTROLS – REDUCING VARIABILITY AT THE SOURCE

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As for many other disciplines, cell-culture based production is under constant pressure to reduce cost of manufacturing and to increase productivity while maintaining the right product quality. To improve process robustness, consistency and efficiency, Biogen has successfully implemented several Process Analytical Technology (PAT) and Advanced Process Controls (APC) initiatives in large-scale manufacturing. Examples include capacitance-based control of culture transfers and nutrient feeding, control of glucose feeding based on in-line Raman spectroscopy, and the use of process models for real-time process monitoring and prediction of process quality attributes. In general, the performance of any control and monitoring scheme is limited by the noise and uncertainties present in the process and here we present cross-functional efforts to minimize and reduce such variations. Examples include disturbances stemming from auxiliary control loops as well as interference of physical nature, such as capacitance probes being impacted by gas sparge. The resulting performance enhancement in existing PAT/APC efforts as well as the potential to enable novel monitoring and control schemes will be discussed.